

Mount Lyell Abt Railway Tasmania



**Nomination for
Engineers Australia Engineering Heritage Recognition**

Volume 2

**Prepared by
Ian Cooper FIEAust CPEng (Retired)**

For

**Abt Railway Ministerial Corporation &
Engineering Heritage Tasmania**

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BIOGRAPHIES

CLARKE, William Branwhite by Ann Mozley¹

William Branwhite Clarke (1798-1878), geologist and Anglican clergyman, was born on 2 June 1798 at East Bergholt, Suffolk, England, the eldest child of William Clarke, schoolmaster, and his wife Sarah, née Branwhite. Brought up in Constable country, Clarke attended his father's school and later Dedham Grammar School. In 1817 he entered Jesus College, Cambridge (B.A., 1821; M.A., 1824). In June 1821 he was made deacon at Norwich Cathedral by Bishop Bathurst, and ordained priest in 1823. After curacies in Suffolk and Sussex he became curate at East Bergholt in 1824 and, five years later when his father died, succeeded him at the East Bergholt Free School. On 3 January 1832 at St Botolph's, Aldersgate, Clarke married Maria Moreton, daughter of Ebenezer and Ann Stather; of their four children, a son and two daughters were born in England and a daughter in New South Wales. In that year he became vicar of the new St Mary's Church at Longfleet, Dorsetshire.



William Branwhite CLARKE

Two influences at Cambridge shaped the direction of Clarke's intellectual life. He developed a lively taste for literature and the classics, and at the lectures of Rev. Adam Sedgwick, Woodwardian professor of geology, was introduced to a subject then casting off the framework of theology and emerging as a factual and inductive science. As a curate poetry engrossed him and in verse Clarke published *Pompeii* (1819), *Carmen Exequiale* (1821), *The River Derwent* (1822), *Recollections of a Visit to Mont Blanc* (1828) and *Lays of Leisure* (1829). In 1824 he was one of the four founders and editors of the short-lived *Cambridge Quarterly Review and Academical Register*; he helped to compile a hymn-book and regularly contributed to literary magazines but science soon gained the upper hand. He became a fellow of the Geological Society of London in 1826 and by 1832 had made several excursions to the Continent. His papers on meteoric phenomena and geology and notes on zoology in the *Magazine of Natural History* in the 1830s attest the scope of his work and he contributed several papers to the *Proceedings* of the Geological Society. He cultivated the leaders of geological science and began the correspondence with Sedgwick and Sir Roderick Murchison that later stimulated and encouraged his lonely researches in New South Wales.

Without ecclesiastical or aristocratic connexions to aid him, Clarke's chances of church preferment were small, and in December 1838, near penury and suffering from rheumatic fever, he accepted the nomination of the Society for the Propagation of the Gospel to a chaplaincy in New South Wales. He arrived at Sydney with his family in May 1839 and was assigned to St Peter's, Campbelltown. But within a week Bishop William Grant Broughton changed his appointment to the headmastership of The King's School, Parramatta, with charge of the near-by parishes of Castle Hill and Dural. In December 1840 he resigned as headmaster because of his health, but continued to minister at Dural and Castle Hill until November 1844. He became rector of Campbelltown and in August 1846 moved to St Thomas's Church, North Sydney, and remained as its first pastor until his retirement in 1871. Prominent though never a leader in the Church in Sydney, Clarke was evangelical and opposed to Tractarianism but he supported Broughton's educational policy and his struggle against the assumptions of Rome.

Clarke left his mark in New South Wales as a geologist rather than as a churchman. In his spare time he moved out from Sydney and Parramatta in a widening arc and collected rocks and fossils, sending many to Sedgwick and publishing his observations in British scientific journals and the *Tasmanian Journal of Natural Science*. Clarke early predicted the colony's mineral wealth. In 1841, chipping the quartziferous slates near Hartley in the Blue Mountains, he discovered particles of gold and later added evidence from Bathurst to the Liverpool Range that the country would be found 'abundantly rich in gold'. In April 1844

¹ Ann Mozley, 'Clarke, William Branwhite (1798–1878)', Australian Dictionary of Biography, National Centre of Biography, Australian National University, <http://adb.anu.edu.au/biography/clarke-william-branwhite-3228/text4865>, published first in hardcopy 1969.

he told Governor Sir George Gipps of his finds and later claimed that the governor directed him to 'Put it away, Mr. Clarke, or we shall all have our throats cut'; it has been argued that this delayed the development of the colony's mineral wealth, but apathy more than fear hindered mineralogical exploration. Clarke did not put his gold away, though he observed a public silence on the subject until Gipps died. He pressed for an official survey of New South Wales and in 1847 became active in drawing public attention to the geological phenomenon of gold.

When Edward Hargraves discovered a goldfield at Ophir in 1851 Clarke acted as the government's scientific adviser and served as a geological surveyor from September 1851 to July 1853, carrying church ministrations to the diggings and to other outlying parts. Travelling on foot and horseback with two servants, he made a reconnaissance from Marulan southwards across the Alps to Omeo; east to Twofold Bay and north from the Hunter River to Brisbane and the Darling Downs. In his twenty-eight reports, published as parliamentary papers in New South Wales and Britain, he outlined the physical and stratigraphical structure of the country he had seen and its metalliferous resources. In 1851 he published *Plain Statements and Practical Hints Respecting the Discovery and Working of Gold in Australia* and in 1860 *Researches in the Southern Gold Fields of New South Wales*.

Scientific recognition followed Clarke's work on gold. In 1856 at the Tasmanian government's invitation he reported on the Fingal goldfield and on the auriferous character of the basin at South Esk, but in 1858 he refused appointment as geological surveyor of Tasmania. Clarke claimed to be the scientific discoverer of Australian gold, a title contested by John Lhotsky, Strzelecki, Hargraves and by Sir Roderick Murchison who published in 1844 a comparison between the Australian 'Cordillera' and the gold bearing Ural chain. In 1861, however, the government of New South Wales honoured Clarke's claim and awarded him a grant of £3000. His part in the discovery and investigation of Australia's gold resources was also recognized by the Royal Society of London who elected him a fellow in June 1876.

Clarke's most important contribution to Australian geology was his work on the age of the coal deposits of New South Wales, a subject which drew him into bitter and protracted controversy with Professor Frederick McCoy. Clarke believed that the Hunter River and Illawarra coalfields were Palaeozoic and much older than those of Europe. He also maintained that the fossiliferous sandstone beneath the coal, the coal itself and plant fossils in the beds above represented one great unbroken series and belonged to the same geological age, either Carboniferous or Devonian. In contrast McCoy, who examined the specimens from Newcastle and the Illawarra that Clarke had sent to Sedgwick at Cambridge, always insisted that a vast geological time separated the true Carboniferous marine deposits below the coal, the coal seams and the beds of plant fossils, the last of which he referred to the true 'Oolitic' (Jurassic) system of Europe. The debate was pursued with asperity in *Transactions* of the Royal Society of Victoria for thirty years. Clarke's careful and persistent field-work prevailed, but the acceptance of his findings was delayed by McCoy's reliance on the palaeontological evidence of the fossils against the stratigraphy of the field. Clarke published a detailed classification of the coal measures in the first edition of his *Remarks on the Sedimentary Formations of New South Wales* in 1867. He had earlier named and described the Hawkesbury and Wianamatta series which he included originally among the Palaeozoic rocks, but in his fourth edition of *Remarks* in 1878 he assigned them correctly to the Mesozoic. Clarke was awarded the Murchison medal of the Geological Society of London in 1877 for his work on the coal measures of New South Wales.

For almost forty years Clarke was prominent in the colony's scientific life. He retained his early interest in meteorology and in 1839-57 kept records of wind and weather at his home at Parramatta and later on the North Shore, and had weather stations in his parishes of Dural, Castle Hill and Campbelltown. In 1842 he contributed twenty articles on meteorology to the *Sydney Morning Herald* and encouraged others to assist in a co-ordinated system of weather observation. In a colony where science was considered a private matter and received scant government aid, Clarke was an ardent publicist for science, contributing countless editorials, articles, reviews and letters to the Sydney press and working to pierce 'the intellectual barrenness of New South Wales'. In 1841-43 he was secretary and curator of the Australian Museum and trustee in 1853-73. Pressure of duties led him to decline a seat on the first senate of the University of Sydney in 1850 and a professorship in geology and mineralogy in 1856, although he was elected a fellow of St Paul's College in 1853. Clarke was a founder of the Royal Society of New South Wales in 1867 and its vice-president until 1876; its Clarke medal, struck as Australia's first scientific honour in 1878, commemorates his work. Still busy with his geological work, he died in Sydney on 16 June 1878 and was buried in the North Sydney cemetery. He was survived by one son and two married daughters, and left an estate valued at £17,000.

Small and indefatigable with a flowing patriarchal beard in later years, Clarke was a mixture of scholar, churchman, practical geologist and publicist. To his parishioners he was a warm-hearted and devoted friend, but in scientific affairs he was a tenacious and often sharp controversialist. He was a born fighter. 'Considering you are a clergyman', Roderick Murchison wrote, 'you are very bellicose'. Above all he was a pioneer. 'When geology was yet unknown and had its way to make', an obituarist claimed, 'who could estimate the immense gain to our young Colony to have a man like Clarke at our disposal ... He excited an interest in the subject; he never ceased to bring the main labour of his life prominently before the public ... He was a centre around which all facts and discoveries were sure to group themselves'. Working for the most part unaided and at his own expense, Clarke made a geological survey in New South Wales, amassing and exhibiting his rocks and fossils, conducting a huge correspondence with scientists and prospectors and acting as scientific mentor to newly-recruited geological surveyors in other colonies until the Department of Mines was established in 1873. In addition to his reports and books, Clarke published some eighty scientific papers, while his geological maps formed the basis of the first geological sketch map of New South Wales, issued by the Department of Mines in 1880. His pioneering on the stratigraphy of New South Wales laid the foundations on which much later work has been based. Clarke's valuable collection of Australian fossils and minerals, acquired by the government on his death, were destroyed with his scientific library in the Garden Palace fire in 1882.

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GOULD, Charles by Maxwell R. Banks and M. L. Yaxley²

Charles Gould (1834-1893), geological surveyor, was born on 4 June 1834 in England, son of John and Elizabeth Gould. After graduating from the University of London (B.A., 1853), he won the Duke of Cornwall's exhibition at the Royal School of Mines in 1854 and a Board of Trade certificate with many first-class passes in 1856. He then travelled with his father in eastern North America early in 1857, worked with the Geological Survey of Great Britain and left for Hobart Town on 12 April 1859. His initial contract at £600 a year with travelling expenses was to make a geological survey and prepare a book on the geology of Tasmania. The contract, first offered on the recommendation of Sir Roderick Murchison, was renewed several times. His surveys covered much of the colony and added greatly to geographical knowledge of western Tasmania. He named peaks along the West Coast Range after contemporary English scientists. He also served as a coal commissioner from March 1862 to June 1867, as a gold commissioner of the western district in 1862 and a magistrate of the territory.

Gould's wide experience, careful observation and well-developed stratigraphic and structural senses led to the first establishment of the order and correlation of Ordovician to Lower Devonian rocks over much of Tasmania, to the correct deduction of the succession of Permian and Triassic coals and Jurassic dolerite and to the suggestion of mining for coal under dolerite sills as along the Mount Nicholas Range, the development of which he strongly urged. The first recognition of glacial deposits in Tasmania was his. His strategy in looking for gold was sound and economical and his results, though negative, still stand. He tried to make the public aware of the dangers of relying too much on analyses of single samples.

An impression of incompleteness is conveyed by his reports and papers; something more or better soon was a common promise and the colonial secretary did not always get the reports when he wanted them. Another area of continuing tension was that of the function of the Survey: Gould wanted a regional geological survey and the secretary a mineral prospecting unit, preferably one for gold; but the final compromise was rather closer to Gould's stand. Combined with these difficulties, the depressed finances of the colony in 1868-74 probably led to the lapse of Gould's contract in August 1869. Gould then seems to have acted as a geological consultant and land surveyor in Tasmania, the Bass Strait islands and New South Wales where he was licensed as a surveyor on 29 January 1873. While in Tasmania he was actively interested in its Royal Society and the fauna and flora. He left Tasmania late in 1873 and seems to have returned to London where he stayed until at least June 1874. From 1880 he travelled in Burma, Singapore, Siam, Hong Kong, China, Korea and Japan, apparently advising on mining properties. He also collected ornithological specimens and material for his *Mythical Monsters* (London, 1886), a rather credulous book, the culmination of an interest extending at least as far back as his Tasmanian days. He returned to Europe early in 1889 but soon sailed to Buenos Aires. He travelled in South America until he died, probably unmarried, in Montevideo, Uruguay, on 15 April 1893.

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² Maxwell R. Banks and M. L. Yaxley, 'Gould, Charles (1834-1893)', Australian Dictionary of Biography, National Centre of Biography, Australian National University, <http://adb.anu.edu.au/biography/gould-charles-3645/text5679>, published first in hardcopy 1972.

BELL, Charles Napier, by Dr. John E. Martin, Parliamentary Library, New Zealand

Charles Napier Bell (1835 - 1906), civil engineer, known as C. Napier Bell, was born at Rothesay, Scotland on 14 September 1835, son of James Stanislaus Bell, trader and adventurer. He was to experience a great breadth of people and cultures and engage in a tremendous range of engineering works. His father became British Resident on the Mosquito Coast of Central America, and was involved in the cutting of mahogany. Charles spent his boyhood years in the company of the young 'King of Mosquito' and Prussian adventurer Gustavus von Tempsky. Towards the end of his life he wrote *Tangweera* (1899) based on his experiences (which included illustrations by von Tempsky). Von Tempsky was to marry his sister, Emelia, and emigrate to New Zealand after time in Australia. *Tangweera*, meticulously observed, became a classic account of the Mosquito people. In this he followed in his father's footsteps. James had published a study of the customs of the people of Circassia in the Caucasus in 1840, and had edited von Tempsky's account of his travels in Mexico and adjacent countries, *Mitla*, published in 1858.

C. Napier Bell returned to Scotland in 1857, when the British had to leave the Mosquito Coast, and was articled to Bell and Miller, Glasgow engineers. He engaged in a survey of the Tay River, and worked on the Edinburgh sewerage works and the Glasgow graving dock. He was then employed by the eminent engineer Sir James Brunlees, who designed railways, docks and piers. He was sent to Brazil in 1860 to assist with the survey of the extremely difficult São Paulo railway (with cable sections) through mountainous terrain. He became a resident engineer for its construction. He then worked on surveying other railways in Brazil including the Rio Grande do Sul railway and designed the Rio Grande waterworks. He also surveyed the Buenos Aires harbour, Argentina. Napier Bell briefly returned to England in 1866 and then worked on railway, gas and waterworks in Russia and Prussia, 1866-70. He was elected M.Inst.C.E. in 1867.

Napier Bell left England for New Zealand in 1871, as an engineer for James Brogden and Sons' railway works in various parts of the country in the early 1870s. Whether his sister, by now widowed as a result of von Tempsky's death in 1868 in guerrilla warfare with Maori, encouraged him to emigrate is not known. He would live in New Zealand for much of the rest of his life and contribute to a great range of infrastructural services vital to the country's development.

When the provincial governments were abolished in 1876 he with others valued the South Island railways taken over by the central government. In 1883 he served on the Royal Commission investigating a line between Canterbury and the South Island's West Coast and carried out a survey and prepared plans for a line through Arthur's Pass and Otira Gorge – approximately the route eventually taken. Napier Bell was for a time Chief Resident Engineer for the Midland Railway Company that from the mid 1880s attempted to push a railway line through from Canterbury to the West Coast.

In 1876 Napier Bell became engineer to the Christchurch Drainage Board. Built on swampy ground, the city had serious drainage problems. He designed drainage and sewerage works for the city, which became the first in New Zealand to have a proper underground sewerage system. He also reported on sewerage works for Wellington and Napier. He was appointed engineer to the Lyttelton Harbour Board, 1878-85, designing its graving dock, patent slip and first wharves (Lyttelton was Christchurch's port).

Napier Bell was extensively involved in harbour construction and associated facilities. He was engineer for Westport Harbour, 1885-93, providing a breakwater, a bridge over the river and a railway line, so that the coalfields and other resources could be exploited. He reported on harbours for Greymouth, Napier, Dunedin (Otago Harbour), Wanganui, New Plymouth, Timaru and Nelson and elsewhere. He designed a graving dock for Wellington. His report of 1900 on the development of Auckland's port facilities was adopted.

He travelled to Australia to report on Tasmanian harbours, designed harbour works for Launceston, Macquarie Harbour on Tasmania's west coast and other harbours, and investigated improved navigation in various rivers in Tasmania. He also designed a graving dock at Hobart and the East Bay Neck ship-canal in Tasmania. He investigated flooding in the Hunter River, New South Wales, and reported on improvements to the Brisbane, Burnett (southern Queensland) and Fitzroy (central Queensland) Rivers. He acted as Chairman of the Royal Commission considering proposals for an outer harbour at Adelaide. He was involved in the development of sewerage and waterworks at Parramatta (Sydney), Hobart, Perth, Fremantle and other towns.

Napier Bell's long and active career was notable for the number and range of his civil engineering schemes. He was elected to represent Australasia on the Council of the Institution of Civil Engineers in 1904. Suffering ill health for the last five years of his life, he died on 3 January 1906 in Derby, Tasmania.

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KELLY, Anthony Edwin (1852–1930) by Doreen Wheeler³

Anthony Edwin Bowes Kelly, company director, was born in 1852 at Ballinasloe, Galway, Ireland, son of John Kelly and his wife Louisa, née Daly. In 1854 John with three children migrated to New South Wales where he became sub-collector of customs at Albury and from 1856 police magistrate at Deniliquin; the rest of the family, including Bowes, joined him in 1860. Educated by a tutor at Deniliquin, Bowes worked as a jackeroo on Riverina sheep-stations and as a drover. He became manager of Billilla Station on the Darling River near Wilcannia about 1875 and was eventually a partner. About 1881 he joined a Melbourne syndicate speculating in land around the Paroo River and made the basis of his fortune. He next fitted out a party to explore the Nullarbor plain region, and subsequently joined a group taking stock by ship to the Kimberley, Western Australia, for the King Sound Pastoral Co.



Bowes Kelly

In 1884, hearing of silver discoveries in the Barrier Ranges, Kelly journeyed to Silverton and on behalf of himself, his brother George (father of Sir George Dalziel), and William

Weatherly bought a one-fourteenth share in the new Broken Hill mine which, however, he did not visit. The share had belonged to James Poole, one of the syndicate of seven who began digging at Broken Hill in 1883. Poole had swapped his share with (Sir) Sidney Kidman for four steers; Kelly bought it for £150 and within ten years it was worth £1.5 million.

In 1885 Kelly was a member of the committee asked by the syndicate (then numbering fourteen) to draw up a prospectus for the new Broken Hill Proprietary Co. Ltd. He was a member of the board of directors which held its first meeting on 15 August and served until his death. He was chairman of the board from 29 April to 2 August 1892, while a great strike saw Broken Hill armed and barricaded, and from 23 March 1893 to 1 February 1895. His longest period as chairman, however, was from 9 March 1917 to 27 October 1922 when he oversaw the most difficult period of B.H.P.'s development: the company's steelworks had opened in 1915 and the organization faced both external competition and internal strain as it moved from mining and smelting at Broken Hill and Port Pirie, South Australia, to steelmaking at Newcastle.

Kelly's association with B.H.P. in 1884 sparked off an interest in mining which absorbed him over several decades. Although he lacked technical mining knowledge he was ever willing to invest, in particular in large fields which were either undercapitalised or poorly managed. He was one of a group of B.H.P. directors which included William Jamieson, William Knox, Duncan McBryde, W. R. Wilson and James Reid, who between them invested in all the main base-metal fields in Australia before 1914. Kelly's brothers, Herbert and Aloysius, followed him into mining investment.

His second fortune was based on the copper mine at Mount Lyell, Tasmania, discovered in 1883 and worked for gold with little success. Kelly and William Orr in 1891 sent ore samples to Broken Hill for analysis, and a decision was made to mine for copper. The Mount Lyell Mining Co. N.L. was formed with Kelly as principal shareholder having some 27,000 shares purchased for £3500. This company was superseded by the Mount Lyell Mining and Railway Co. Ltd in 1893; Kelly was a director until his death and chairman until 1911 and in 1914–24. Enormous capital expenditure — approximately £400,000 — was required for the building of a railway to Strahan and a smelter, but with excellent management the mine made substantial profits for Kelly and other shareholders by 1910.

³ Doreen Wheeler, 'Kelly, Anthony Edwin (1852–1930)', Australian Dictionary of Biography, National Centre of Biography, Australian National University, <http://adb.anu.edu.au/biography/kelly-anthony-edwin-6916/text11999>, published first in hardcopy 1983, accessed online 4 July 2015.

In 1897 Kelly was one of four directors of the Emu Bay Railway Co. Ltd, floated to connect the copper fields with the port of Burnie. Following the huge success of Broken Hill's Silverton Tramway, the Emu Bay Co. was rushed for shares. But there were two other competing lines, including Mt Lyell's own line to Strahan, and no dividends were paid. In 1912 Kelly, with Tasmanian entrepreneur Lindsay Tulloch, bought up shares in the Hercules and Primrose silver-lead-zinc mines at Mount Read and Rosebery. A planned merger with the German owners of the Zeehan smelters, the Tasmanian Smelting Co., was thwarted by World War I. But in 1915 Mount Lyell acquired the Hercules and Primrose shares as well as the Tasmanian Copper Co.'s Mount Read mine and formed the subsidiary Mount Read and Rosebery Mines Ltd. In 1920 this was sold to the Electrolytic Co. of Australia Ltd. Not all Kelly's Tasmanian ventures were successful. He lost money on Zeehan and Dundas enterprises; a cement works at Maria Island and the Sea Elephant Tin Mining Co. on King Island.

In 1902 Kelly bought the historic Tasmanian station Norton Mandeville. He also invested in city and rural properties around Melbourne; at his mansion Moorakynne in Glenferrie Road, Malvern, the family reputedly dined off gold plate. He was a member of the Malvern Shire Council in 1892-96. A director of the Colonial Bank of Australasia from 1907, and chairman from 1914, until its merger with the National Bank of Australasia Ltd in 1918, Kelly remained a director of the National Bank, and from 1909 of Union Trustees, Executors and Agency Ltd. He was president of the Australian Club in 1903-05 and of the Athenaeum Club in 1925-26. Kelly was over 6 feet (183 cm) tall, 'a massive man with a bone-crushing handshake', ginger-haired. The story of board meetings ending with a two-up game played with sovereigns clings to his name. When he died at Moorakynne on 16 October 1930, little remained of his original fortune; his estate was valued for probate at £36,589 in Victoria and £1895 in New South Wales. He was survived by his wife Mary Fanny, née Hawley, whom he had married at Christ Church, South Yarra, on 14 February 1888, and by six of his nine children. He was buried in St Kilda cemetery with Anglican rites.

For at least four decades Bowes Kelly enhanced Australian mining and manufacturing. He combined financial daring with shrewd appreciation of mining or industrial possibilities and gave extraordinary time to running Australia's main manufacturing venture, B.H.P. Skilled in manipulating the stock-market, he never speculated for his own financial gain in mines which lacked a solid basis for mineral wealth. His investments instead encouraged the growth of companies which both gave employment to thousands and broadened the base of Australian economic life.

Life Summary [\[details\]](#)

Birth - 1852

[Ballinasloe, Galway, Ireland](#)

Death - 16 October 1930

[Malvern, Melbourne, Victoria, Australia](#)

Cultural Heritage

- [Irish](#)

Religious Influence

- [Anglican](#)

Occupation

- [company director](#)
- [copper mine owner](#)
- [land speculator](#)
- [mining investor](#)
- [silver, lead, zinc mine owner](#)

Clubs

- [Athenaeum Club \(Melbourne\)](#)
- [Australian Club \(Melbourne\)](#)

Key Events

- [Broken Hill miners strike, 1892](#)

Key Organisations

- [Broken Hill Central Mine \(NSW\)](#)
- [BHP](#)
- [Mount Lyell Mining and Railway Co Ltd](#)
- [Emu Bay Railway Co Ltd](#)
- [Colonial Bank of Australasia](#)
- [Union Trustees, Executors and Agency Ltd](#)
- [Mount Read and Rosebery Mines Ltd](#)
- [National Bank of Australasia](#)

Properties

- [Billilla \(NSW\)](#)
- [Norton Mandeville \(Tas\)](#)

Stately Homes

- [Moorakynne \(Malvern, Melbourne\)](#)

Workplaces

- [Malvern Shire Council \(Melbourne\)](#)

STICHT, Robert Carl (1856–1922) by Ian McShane⁴

Robert Carl Sticht, metallurgist and mining engineer, was born on 8 October 1856 at Hoboken, New Jersey, United States of America, son of German-American parents from Brooklyn. He graduated B.Sc. from the Brooklyn Polytechnic in 1875, then specialized in metallurgy at the Royal School of Mines, Clausthal, Germany, completing his studies in 1880. Appointed chief chemist and assistant metallurgist at a Colorado smelting company, he became interested in smelting techniques and in his fifteen years on the fields of Colorado and Montana became the foremost authority on pyritic smelting in the U.S.A.

In 1893 he was approached by William Knox and William Orr, directors of the newly formed Mount Lyell Mining & Railway Co. Ltd, who offered him the position of metallurgist at the new Queenstown mine, Tasmania. Sticht arrived at Queenstown in 1895 with his wife of six months, Marion Oak, née Staige, from Illinois; he was to become a dominant figure in Tasmanian industry and in the west-coast community.

His first task was to persuade the company principals to abandon their plans of roasting the Mount Lyell ore and smelting it in a blast furnace in favour of the more efficient but fickle process of pyritic smelting. Sticht directed the construction of a reduction works, partly of his own design, and the first two furnaces were fired in 1896. Appointed general manager in 1897, he was not a desk-bound administrator, but spent much time on the works' floor and set about making the remote west-coast mine as self-sufficient as possible.

Although the *Economist* nominated Mount Lyell as the best-managed mine in Australasia, the ore body proved disappointing, but the efficiency of the Lyell smelters partly offset the poor yield of the ore and in 1902 Sticht announced the first successful purely pyritic smelting in the world. The difficulty of sustaining this process, however, led him to reintroduce up to one per cent coke into the furnace.

As smelting required the correct fusion of air, metal, flux and fire, so Sticht conceived of the Mount Lyell works as a unit within which natural resources, capital and labour should work in concert to achieve maximum productive efficiency. A paternalistic manager, Sticht would not concede that the interests of the company were not fully shared by the workforce. He opposed union organization, holding that the Amalgamated Miners' Association challenged his authority. To counter what he considered to be the displaced loyalty of the miners, he established and became president of a medical union which offered first-rate services.

The years before World War I were the most trying of Sticht's tenure. Labour shortages, industrial disputes and a mining disaster in which forty-two men were killed led the company to improve living conditions for the workforce. Sticht's confrontationist approach to worker organization was not long favoured by the directors who appointed R. M. Murray, a local metallurgist, as deputy manager to take charge of housing and co-operative schemes, and to mediate between Sticht and his workforce.

Sticht had pioneered a metallurgical technique that paid handsome dividends—in one year the company had earned more revenue than the Tasmanian government—but by the 1920s it had been superseded by the flotation method of separating copper. His last years were marked by inefficiency.



**Robert STICHT with wife Marion
c1915**

⁴ Ian McShane, 'Sticht, Robert Carl (1856–1922)', Australian Dictionary of Biography, National Centre of Biography, Australian National University, <http://adb.anu.edu.au/biography/sticht-robert-carl-8670/text15163>, published first in hardcopy 1990

In 1920, following the collapse of world prices, the company was selling copper at a loss. Sticht's solution was to cut wages and to shorten working hours, but his plan was opposed by the Combined Unions Council and the Commonwealth Court of Conciliation and Arbitration. In 1921 he fell ill and was replaced as general manager next year by Murray who soon abandoned pyritic smelting and returned the mine to profitability.

Sticht was short and stocky, with a bald pate and fair moustache. Abstemious and careful, he urged restraint among his employees, particularly in regard to alcohol. When old or unlucky prospectors approached him for a job, he was usually sympathetic. His house, Penghana, overlooked the reduction works, but within its walls he was cocooned from that environment. He read widely and assembled a fine private library which included items of *incunabula*, Caxton Bibles, Reformation tracts, early editions of Shakespeare and Australiana. His art collection included Dürer woodcuts and Rembrandt etchings. Some of it is housed in the National Gallery of Victoria, acquired through the Felton bequest.

Survived by his wife and three sons, Sticht died of renal carcinoma in St Margaret's Hospital, Launceston, on 30 April 1922. His body was taken to Melbourne for cremation at Springvale, but at his request there was no funeral service: he had once described himself as a 'scientific agnostic'. The mineral stichtite commemorates his name.

Life Summary [\[details\]](#)

Birth

8 October 1856
Hoboken, New Jersey, United States of America

Death

30 April 1922
Launceston, Tasmania, Australia

Cultural Heritage

- American
- German

Religious Influence

- Agnostic

Occupation

- copper mine manager
- metallurgist

DRIFFIELD, Edward Carus (1865-1945)

Edward Carus Driffield, was born in South Australia. He moved to Queenstown in 1894 to take up a position overseeing the construction of the short stretch of rail from the Queenstown Station to the Mt Lyell reduction works. Driffield had experience with two previous railway construction projects on the Mainland.

When the Mount Lyell Railway contractor was experiencing delays Driffield was put in charge to oversee the whole first stage of the Railway from Teepookana to Queenstown. He employed day labour resources to construct the section from Dubbil Barril to Lynchford including the rack section. He established his base at Camp Spur and had individual work crews spread along the route. This method of simultaneous construction saw the overall project completed in 19 months; a significant achievement for the young engineer and the Company.

Driffield was well liked by his colleagues and the works crews; after a period of illness in 1898 (he was an asthmatic) he was presented with an album of photographs along with an award signed by General Manager, Sticht, and a number of his colleagues that read:



E C Driffield

“With feelings of very great pleasure we welcome your return to the scene of your successful labours. We have sincerely regretted the serious illness that prostrated you for so many weeks and have anxiously awaited your recovery, over which we rejoice. Our earnest hope is that in resuming your important and onerous duties, you will be blessed with that priceless boon of good health.

It's a small token of our appreciation of your ever courteous manner and able administration of the affairs of the Department with which we are proud and to be associated we beg that you will accept this Album containing photographic views of the charming and picturesque scenery of the West Coast of Tasmania also pictures illustrative of the progress of the work which you have so admirably directed. Your eye will doubtless rest with gratification on some of the scenes depicted and we trust your recollection of the friends and humble co-workers who helped you to carry out the great undertakings with which you have been so intimately identified will always be the most agreeable nature.

We sincerely trust that you may long continue to live amongst us as our leader and of our continued loyalty and esteem you may always be rest assured.”⁵

He remained with Mt. Lyell for 30 years holding the position of Superintending Engineer of Railways. He retired in 1923 due to ill health but continued as a consulting engineer to the Company.

He met and married Katherine Wroe of Colebrook in 1903 and settled in Queenstown, having two daughters, Vera and Mary (McFarlane). The Driffields were well respected and became active in community and regional affairs. At a Citizens' Farewell Dinner for the Driffields, The Hon. Andrew Lawson MLC, said

“...the citizens had, in a large measure, to thank Mr. Driffield for their township, for it was his foresight and ability in originally laying out the thoroughfares and water and sewerage systems that were mainly responsible for its present well-oriented condition. Mr. Driffield was one of the first justices on the field and had in a variety of ways, rendered loyal service to the district during the past 30 years. Mrs. Driffield [is to be] considered one of the finest worker in the cause of charity that the community had had and the loss, occasioned by her departure would be one not easily remedied.”⁶

⁵ University of Melbourne Archives

⁶ *Advocate* 27th November 1923

PICTURE GALLERY

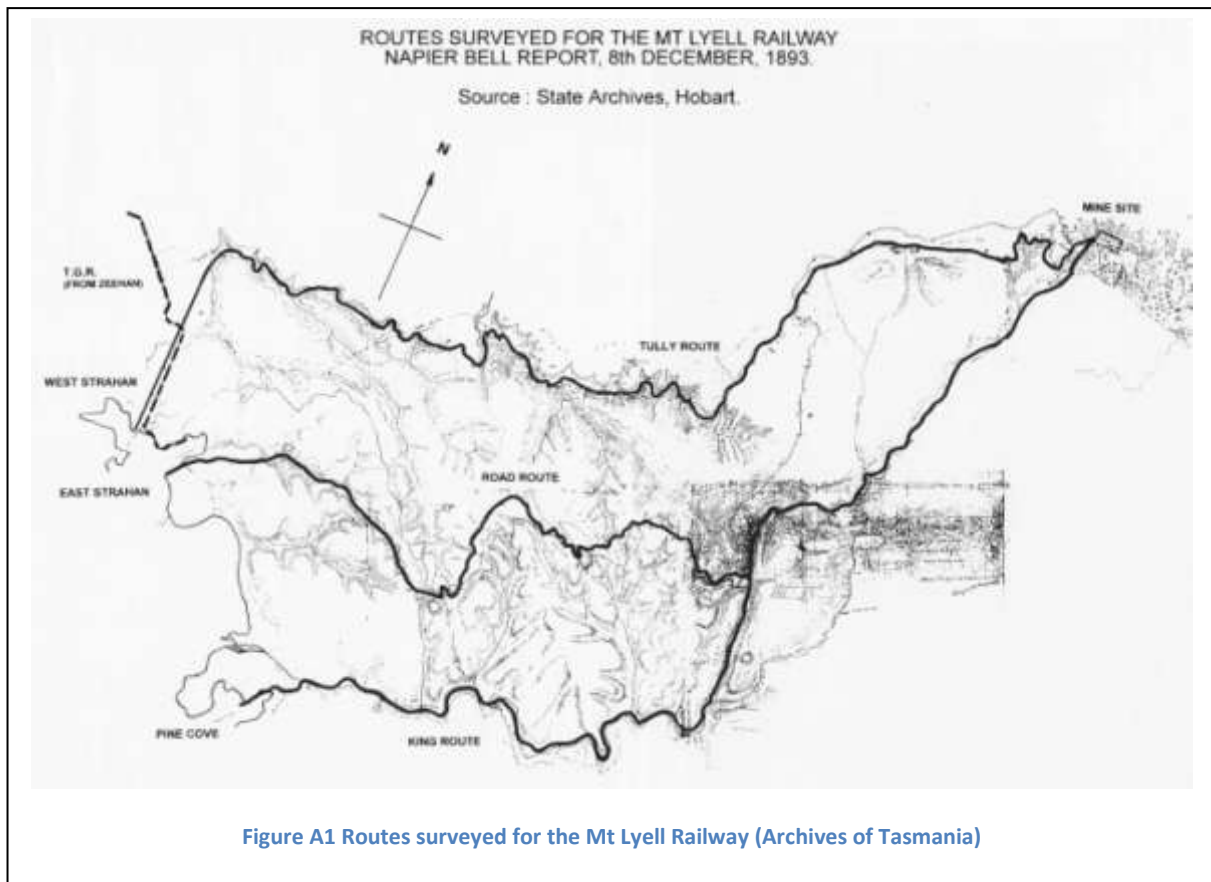




Figure A3 Teamsters and friends on the early track formation (AOT)



Figure A4 Abt Laying the rack rail on the climb up from Dubbil Barril (AOT)



Figure A5 Cutting at Rinadeena Saddle (AOT)



Figure A6 Abt No. 1 prior to dismantling, packaging and shipping to Tasmania (Mitchell Library, Glasgow, UK)



Figure A7 Abt No. 1 as changed by Mt Lyell workshop. The changes were fed back to the manufacturer and applied to all later versions (Jim Stokes 1963)

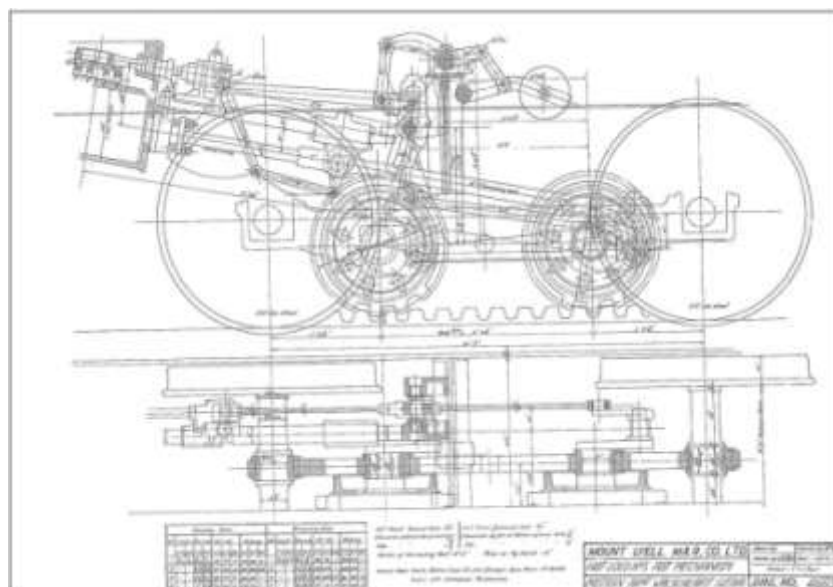


Figure A8 Schematic diagram showing Abt mechanical motion arrangement and Walschaert valve gearing (AOT)



Figure A9 Twin timber trusses of 'Quarter Mile' Bridge spanning the King River c1900s (AOT)



Figure A10 'Quarter Mile' trestle section. Note the round timber bracing installed to stabilise the structure (Peter Stock 1963)



Figure A11 New 'Quarter Mile' with steel girder section and 3 Bailey sections (Cooper 2001)



Figure A12 Repainting of Iron Bridge following removal of lead paint (Cooper 2000)



Figure A13 Iron Bridge restoration cross bracing & strengthening additions (Cooper 2005)



Figure A14 Iron Bridge new piers and girder section on eastern side (Cooper 2005)



Figure A15 Mt Lyell Railway carriages at Queenstown (Peter Stock 1963)



Figure A16 West Coast Wilderness Railway premium car replica carriage (Cooper2003)



Figure A17 Restored Mt Lyell Railway guard's van (Cooper2003)



Figure A18 Regatta Point rail yard c1930s. Engine shed and turntable are on the LHS. (AOT)



Figure A19 Original Regatta Point Engine Shed was restored in 2004 and is now used for Abt and Drewry locomotive maintenance. (Cooper 2005)



Figure A20 After 1963 the floor of Engine Shed was concreted over, including two pits. One of the pits was uncovered during the restoration and is now in use (Cooper 2004)



Figure A21 Regatta Point Station has seen little internal and external change (Cooper2005)